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PATENT SPECIFICATION

695,420

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COMPLETE SPECIFICATION

Improvements in or relating to Tire Mold

We, HAROLD E. KIMES CORPORATION, a Corporation organised under the laws of the State of Illinois, United States of America, of 441, West Stephenson Street, City of Freeport, State of Illinois, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to tyre moulds and is more particularly concerned with the provision of means provided on a mould to receive and support a chain of connected metallic inserts which are employed in a tyre tread to prevent punctures or skidding during use of the tyres on vehicles.

The metal inserts are preferably formed of hard resilient wire and of generally U-shape with the ends of the arms projecting through the tyre tread for engagement with a road surface. To facilitate manufacture of the inserts and the moulding of same within tyre treads, the inserts are preferably in the form of a chain of U-shaped members connected together at the ends of their legs. In moulding a tread on a tyre casing a chain of inserts must first be secured in fixed position upon the mould, and the present invention contemplates the provision of a mould provided with a guide strip upon which a chain of U-shaped metallic inserts may be supported in predetermined fixed position during the moulding operation.

The present invention comprises a device adapted to embed a chain of connected resilient U-shaped wire inserts within the tread of a tyre including a retaining strip having radially outwardly converging side walls adapted to be engaged between the ends of opposing legs of said chain of inserts.

The present invention provides a tyre mould having an annular inner surface provided with spaced ribs to form a tread design, a retaining strip being provided on said surface between each pair of said ribs and each strip having side walls formed to define with said surface a pair of spaced recesses to receive the ends of the legs of generally U-shape resilient metallic inserts.

The present invention also provides a tyre mould having an annular inner surface provided with spaced annular ribs to form a tread design and an annular retaining strip provided on said inner surface between each pair of said ribs, each strip having radially outwardly converging side walls adapted to be engaged between the ends of opposing legs of a chain of generally U-shape resilient metallic inserts.

This invention further contemplates the provision of a guide strip which is formed to be snugly engaged between the resilient arms of the U-shaped inserts, the chain of U-shaped inserts being manually pressed into a straddling relation upon the guide strip and held against accidental displacement by the clamping force exerted by the resilient arms.

This invention embodies other novel features, details of construction and arrangement of parts which are hereinafter set forth in the specification and claims. The invention will now be more fully described with reference to the accompanying drawing, wherein:

Fig. 1 is a plan view illustrating a chain of metallic inserts formed with arcuate resilient arms to straddle and engage a guide strip provided on a mould matrix.

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary transverse sectional view illustrating the manner in which a chain of metallic inserts is supported upon the matrix guide strip.

Fig. 4 is a detail sectional view taken along the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary transverse sectional view, corresponding to Fig. 3, illustrating a modified form of this invention.

Referring now to the drawing for a better understanding of this invention, and more particularly to Figs. 1 and 2 therein, the chain of metallic inserts C is shown as comprising a length of wire bent to define a series of generally U-shaped inserts 6 formed with curvilinear bases 7 and arcuate arms 8 which are bowed away from each other, the inserts being connected together at the ends of the arcuate arms by loop portions 9. The chain of metallic inserts may be formed from bronze wire, hardened steel wire, or other

[Price 2/8]

metal or alloy depending upon the physical characteristics desired and the type of service in which the tyres are to be employed after the latter have been formed with treads having metallic inserts moulded therein. In any event, it has been learned that the wire employed in forming the chain of inserts should have some resiliency in order to permit bending of the arms 8 during use in a tyre tread without breakage, and further that the wire should be relatively hard to prevent undue wear of the arms during their engagement against the surface of a road. It has also been found desirable to substantially weaken the loop portions 9 connecting the U-shaped inserts together, the loop portions being weakened by flattening same or cutting part way through same. By providing a chain of metallic inserts with weakened loop portions 9, the inserts 6 are adapted to break away and be separated from each other almost immediately upon use of the tyre upon a vehicle. As illustrated in Fig. 1, the angle "X" between the arcuate arms 8 of adjacent inserts may be from 10° to 75° depending upon the size and shape of the inserts. The chain of connected inserts C is adapted to be sold and shipped in rolls of predetermined size and weight and then cut into suitable lengths by the tyre manufacturers and retreaders for mounting in tyre mould matrices.

Figs. 3 and 4 in the drawing illustrate a portion of a tyre mould 11 having a guide strip 12 secured to its inner face by means of rivets or screws 13. It will, of course, be understood that the mould 11 is used to form only one rib of the tread of the tyre, and therefore comprises only one element of the composite mould for the complete tyre. Moreover, moulds of various shapes and sizes may be provided with guide strips 12, depending upon the tread design desired. The guide strip 12 is preferably formed with a convex front face 14 to facilitate mounting of the chain of inserts C upon the strip. The strip 12 is also preferably formed with outwardly converging side walls 15—15 to be engaged by the ends of the arcuate arms 8—8 of the metallic inserts. Due to the resiliency of the wire, a chain of inserts may be manually pressed into fixed position over the guide strip 12 to dispose the ends of the arcuate arms 8—8 in clamping engagement against the side walls 15—15 of the strip. A considerable saving in time may be effected by employing a roller (not shown) to press the chain of inserts into fixed position upon the guide strip 12. After the tread 16 has been moulded onto a tyre casing 17, it will be noted that the guide strip 12 may readily be withdrawn from its position between the arms 8—8 of the chain of inserts by merely opening the mould.

Fig. 5 illustrates a modified form of this invention in which the mould 18 is formed with parallel grooves 19—19 to define a guide strip 20 having a convex front face 21 and outwardly converging side walls 22—22. This form of the invention is otherwise similar to the form heretofore described in connection with Figs. 3 and 4 in the drawing.

From the foregoing description of this invention, illustrated in the drawing, it will be noted that the moulds now in use in moulding treads onto tyre casings may readily be provided with guide strips 12 to support chains of metallic inserts C, and that the guide strips will thus serve to accurately position and prevent displacement of the chain of inserts during the moulding of a tread onto a tyre. After the moulding operation has been completed, the mould is opened in the usual manner to permit withdrawal of the finished tyre.

What we claim is:—

1. A device adapted to embed a chain of connected resilient U-shaped wire inserts within the tread of a tyre including a retaining strip having radially outwardly converging side walls adapted to be engaged between the ends of opposing legs of said chain of inserts.

2. A device according to Claim 1, wherein said retaining strip has a top wall, said side walls being parallel and merging with and converging toward said top wall to frictionally engage the free ends of said inserts.

3. A tyre mould having an annular inner surface provided with spaced ribs to form a tread design, a retaining strip being provided on said surface between each pair of said ribs and each strip having side walls formed to define with said surface a pair of spaced recesses to receive the ends of the legs of generally U-shaped resilient metallic inserts.

4. A tyre mould having an annular inner surface provided with spaced annular ribs to form a tread design, and an annular retaining strip provided on said inner surface between each pair of said ribs, each strip having radially outwardly converging side walls adapted to be engaged between the ends of opposing legs of a chain of generally U-shaped resilient metallic inserts.

5. A tyre mould according to Claim 3 or 4, wherein the inner surface of said strip is convex to spread the legs of inserts mounted upon the strip.

6. A tyre mould according to Claim 3 or 4, wherein the retaining strip is demountably secured on said inner surfaces.

7. A device adapted to embed a chain of inserts within the tread of a tyre substantially as herein described with reference to Figure 3 and 4 or Figure 5 of the accompanying drawing.

8. A tyre mould constructed substantially as herein described with reference to Figures 3 and 4 or Figure 5 of the accompanying drawings.

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695,420 COMPLETE SPECIFICATION
1 SHEET

Fig. 1

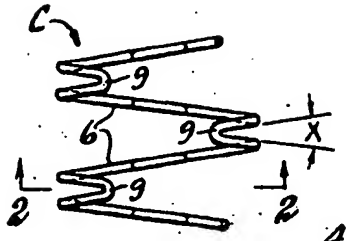

Fig. 2

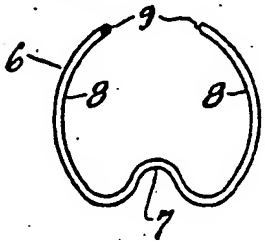

Fig. 3

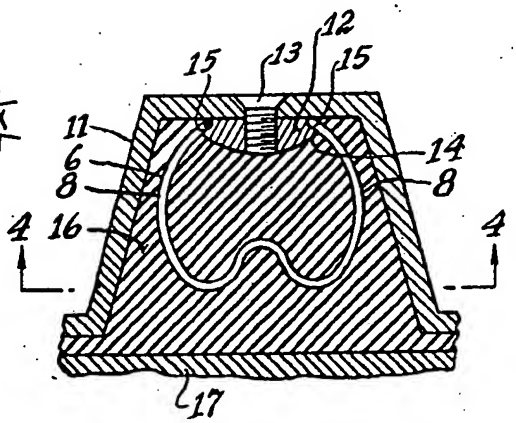

Fig. 4

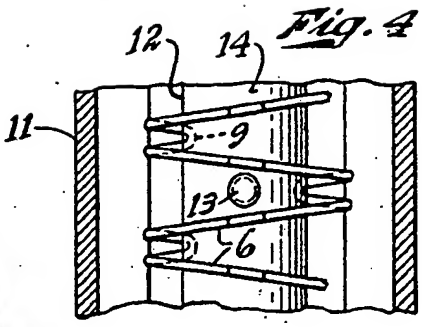

Fig. 5